

REMARKS

Claims 1-6, 8-38, and 40-49 are pending in the application. Claims 7 and 39 are canceled.

Claims rejections – 35 USC 101

In this section the Examiner rejected the invention as disclosed in claims 1-49 as directed to non-statutory subject matter. The Examiner argued that none of the claims is limited to practical applications in the technological arts. The Examiner specifically argued that the term "user input", in the claims, is a set of abstract ideas which is manipulated by the applicant, and which does not limit the claims to the transformation of real world data by some disclosed process.

The present invention, as described in the background of the invention section, relates to the formation and the application of a knowledge base in general and in the area of data mining and automated decision making in particular. The automatic decision-making taught by the present invention, is based on the application of a set of rules to score values of outcomes, which results from the application of a *predictive* quantitative model to new data. The knowledge base utilized by the predictive quantitative model *relates to behavior of a real life system*. The modeling and decision making process taught in the present invention is illustrated in Figure 1, and described on page 18, line 17: " Fig. 1A is a simplified diagram of a modeling and decision making process. In FIG. 1, a knowledge tree 1 is built up from qualitative information of a system. The knowledge tree 1 consists of a series of cells arranged in a tree in such a way that the positions of the cells in the tree *relate to behavior of a real life system, the cells themselves relating to objects or stages in the real life*

system. The choice of cells is preferably made by an expert and the choice of relationships between cells may also be made by the expert or may be made automatically and then modified following expert input.

The present application further describes on page 20, line 16:" The quantified model preferably *has predictive abilities with respect to the behavior of the system that is being modeled*, meaning that inputs and outputs in the system can be followed through the knowledge tree to predict future states."

Thus the present invention is input with *a real life system* based data model.

Furthermore, the application of the present invention provides with *a useful, concrete, and tangible* result, namely, *the prediction of the behavior of a modeled real world system.*

An example is provided by the present application on page 36, line 2: "Knowledge tree map 120 comprises arrows 121, 122, and 123 which represent the influence of each of three respective medications for high blood pressure, arrow 124 represents the influence of various amount of insulin, and arrow 125 represents the patient's physical activity on the diabetes. Arrow 125-5 indicates the effect of food intake.

Arrows 126, 127 and 128 represent the influence of each of three respective medications for the heart condition. Arrow 129 represents the influence of the patient's blood pressure on his heart condition; arrow 210 represents the effect of the patient's blood sugar level on his general health; arrow 211 represents the effect which the patient's heart condition has on his general health, and arrow 212 represents the effect of the patient's blood pressure on his general health. Arrow 213 is the outcome of the patient's general health, which is also the final output of the knowledge tree map 120. Armed with knowledge tree map 120, the doctor can make a more precise diagnosis for this patient."

Claim 1 defines an apparatus for constructing a quantifiable model *of a real life system*, the apparatus comprising: an object definer for converting user input into at least one cell having inputs and outputs, the user input relates to behavior of *a real life system*,

a relationship definer for converting additional user input into relationships associated with the cells such that each of the relationships is associatable with the cells via one of the inputs and outputs, the additional user input relates to behavior of *a real life system*, a quantifier for analyzing a data set to be modeled to assign quantitative values to the relationships and to associate the quantitative values with the associated inputs and outputs, thereby to generate a quantitative model, the quantitative model being a *predictive model usable for decision making in relation to the real life system*.

Thus claim 1 is limited to a practical application of technological arts, and is believed to be allowable.

Claim 8 defines an apparatus for studying a process *relating to a real life system* and having an associated empirical data set, the apparatus comprising: an object definer for converting user input into at least one cell having inputs and outputs, *the user input relates to behavior of the real life system*, a relationship definer for converting additional user input into relationships associated with the cells such that each of the relationships is associatable with the cells via one of the inputs and outputs, the additional user input relates to behavior of a real life system, a quantifier for analyzing the associated empirical data set to assign quantitative values to the relationships and to associate the quantitative values with the associated inputs and

outputs, thereby to generate a quantitative model, the quantitative model is *a predictive model usable for decision making in relation to the real life system.*

Thus claim 8 is limited to a practical application of technological arts, and is believed to be allowable.

Claim 15 defines an apparatus for constructing a predictive model for a process, *the process relating to a real life system*, the apparatus comprising: an object definer for converting user input into at least one cell having inputs and outputs, the user input *relates to behavior of the real life system*, a relationship definer for converting additional user input into relationships associated with the cells such that each of the relationships is associatable with the cells via one of the inputs and outputs, the additional user input relates to behavior of *the real life system*, a quantifier for analyzing a data set relating to the process to be modeled to assign quantitative values to the relationships and to associate the quantitative values with the associated inputs and outputs, thereby to generate a model *predictive of the process*.

Thus claim 15 is limited to a practical application of technological arts, and is believed to be allowable.

Claim 23 defines an apparatus for reduced dimension data mining, using a quantifiable model *of a real life system*, comprising:
 an object definer for converting user input into at least one cell having inputs and outputs, *the user input relates to behavior of the real life system*,
 a relationship definer for converting additional user input into relationships associated with the cells such that each of the relationships is associatable with the cells via one of the inputs and outputs, the additional user input *relates to behavior of the real life system*, a quantifier for analyzing a data set relating to a process to be modeled

comprising a selective data finder to find data items associated with the relationships and ignore data items not related to the relationships, the quantifier being operable to use the found data to assign quantitative values to the relationships and to associate the quantitative values with the associated inputs and outputs.

Thus claim 23 is limited to a practical application of technological arts, and is believed to be allowable.

Claim 29 defines a method of constructing a quantifiable model *of a real life system*, comprising:

converting user input into at least one cell having inputs and outputs, the user input *relates to behavior of the real life system*, converting additional user input into relationships associated with the cells, such that each of the relationship is associated with the cells via one of the inputs and outputs, the additional user *input relates to behavior of the real life system*, analyzing a data set to be modeled to assign quantitative values to the relationships and to associate the quantitative values with the associated inputs and outputs, thereby to generate a quantitative model, *the quantitative model is a predictive model usable for decision making, in relation to the real life system.*

Thus claim 29 is limited to a practical application of technological arts, and is believed to be allowable.

Claim 30 defines a method for reduced dimension data mining *using a quantifiable model of a real life system*, comprising:

converting user input into at least one cell having inputs and outputs, the user input *relates to behavior of the real life system*, converting additional user input into relationships associated with the cells, such that each of the relationship is associated

with the cells via one of the inputs and outputs, the additional user input *relates to behavior of the real life system*, analyzing a data set relating to a process to be modeled comprising finding data items associated with the relationships and ignoring data items not related to the relationships, and using the found data to assign quantitative values to the relationships and to associate the quantitative values with the associated inputs and outputs, *the quantitative model being a predictive model of the real life system, usable for decision making in relation to the real life system*. Thus claim 30 is limited to a practical application of technological arts, and is believed to be allowable.

Claim 31 defines a knowledge engineering tool for verifying an alleged relationship pattern within a plurality of objects, the objects *relating to a real life system*, the tool comprising: a graphical object representation comprising a graphical symbolization of the objects, *the objects being related to behavior of the real life system*, and assumed interrelationships, the graphical symbolization including a plurality of interconnection cells each representing one of the objects, and inputs and outputs associated therewith, each qualitatively representing an alleged relationship, and a quantifier for analyzing a data set of the objects to assign quantitative values to the relationships and to associate the quantitative values with the alleged relationships, thereby to verify the alleged relationships.

Thus claim 31 is limited to a practical application of technological arts, and is believed to be allowable.

Claim 38 defines machine readable storage device, carrying *real life system* data for the construction of: an object definer for converting user input into at least one cell having inputs and outputs, the user input relates to behavior *of the real life system*, a

relationship definer for converting additional user input into relationships associated with the cells such that each of the relationships is associatable with the cells via one of the inputs and outputs, the additional user input *relates to behavior of the real life system*, and a quantifier for analyzing a data set to be modeled to assign quantitative values to the relationships and to associate the quantitative values with the associated inputs and outputs, thereby to generate a quantitative model, the quantitative model is *a predictive model usable for decision making, in relation to the real life system.*

Thus claim 38 is limited to a practical application of technological arts, and is believed to be allowable.

Claim 40 defines a data mining apparatus for using empirical data to model a process, *the process relating to a real life system*, comprising: a data source storage for storing data relating to the process; a functional map for describing the real life process in terms of expected relationships, a relationship quantifier, connected between the data source storage and the functional process map, for utilizing data in said data storage to associate quantities with the expected relationships, thereby to provide quantified relationships to the functional map, thereby to model *the real life process, and predict the behavior of the real life process.*

Thus claim 40 is limited to a practical application of technological arts, and is believed to be allowable.

Claim 43 defines an apparatus for obtaining new information regarding a process *the process relating to a real life system and having an associated empirical data set*. The apparatus comprises: an object definer for converting user input into at least one cell having inputs and outputs, the user input *relates to behavior of a real life system*, a relationship definer for converting additional user input into relationships associated

with the cells such that each of the relationships is associatable with the cells via one of the inputs and outputs, the additional *user input relates to behavior of the real life system*,

a quantifier for analyzing the associated empirical data set to assign quantitative values to the relationships and to associate the quantitative values with the associated inputs and outputs, thereby to generate a quantitative model, the quantitative values comprising new information of the process, *the quantitative model is a predictive model usable for decision making, in relation to the real life system*.

Thus claim 43 is limited to a practical application of technological arts, and is believed to be allowable.

Claim 49 defines a method for automated decision-making, *relating to a real life system*, by a computer comprising the steps of: modeling of relations between a plurality of objects, *the objects relating to the real life system*, each object among the plurality of objects having at least one outcome, each object among the plurality of objects being subjected to at least one influential factor possibly affecting the at least one outcome, the objects *relate to behavior of the real life system*, data mining in datasets associated with the modeled relations between the at least one outcome and the at least one influential factor of at least one object among the plurality of objects, building a quantitative model to predict a score for the at least one outcome, the quantitative model is *a predictive model usable for decision making, relating to the real life system*, and making a decision according to the score of the at least one outcome of the at least one object.

Thus claim 49 is limited to a practical application of technological arts, and is believed to be allowable.

It is therefore submitted that all present independent claims are limited to practical applications in the technological arts, and are believed to be allowable.

The remaining claims are believed to be allowable as being dependent on allowable main claims.

All of the matters raised by the Examiner have been dealt with and are believed to have been overcome. No new matter is added by the present amendments since the concept of the real life system is taught in the present application, for example, on page 36, the application describes a human blood system, being influenced by three different medications, by insulin, by physical activity and by food intake.

In view of the foregoing, it is respectfully submitted that all the claims now pending in the application are allowable over the cited references. An early Notice of Allowance is therefore respectfully requested.

Respectfully submitted,



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